



FFORDD GYSWLLT
DWYRAIN Y BAE
EASTERN BAY LINK



Llywodraeth Cymru
Welsh Government



Eastern Bay Link Road Road Safety Audit (Stage 1) Junctions with Designer's Comments

June 2016



CAPITA



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Eastern Bay Link Road

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CASS HAYWARD



Contents

1. Introduction	1
2. Road Safety Audit Team	2
3. Scope of the Road Safety Audit	3
4. Information forming the basis of the Audit	4
5. Declaration	6
6. Site Specific Comments and Recommendations	7

Appendices

Appendix A Reference Plan

1. Introduction

This Stage 1 Road Safety Audit forms part of the commission from the Welsh Government to design the Eastern Bay Link Road Scheme which was instructed in the Road Safety Audit brief dated May 2016.

A Road Safety Audit is defined in Standard HD 19/15 as "The evaluation of Highway Improvement Schemes during design and at the end of construction (preferably before the scheme is open to traffic) to identify potential road safety problems that may affect any users of the highway and to suggest measures to eliminate or mitigate those problems. The audit process includes the accident monitoring of Highway Improvement Schemes to identify any road safety problems that may occur after opening."

The procedures and practices associated with Road Safety Audits are set out in Standard HD 19/015 and the CIHT Road Safety Audit Guidelines. The main procedural and practice features recommended in these documents include:

- Road Safety Audits should be undertaken at pre-set times in a schemes planning and implementation;
- Road Safety Audits should be performed by a team which is independent of the design team;
- The Audit Team should have specialist expertise in the fields of Road Safety Engineering and Accident Investigation and Prevention;
- Road Safety Audits should be carried out with the purpose of identifying design and/or construction features which should be modified in the interests of road safety and should seek to provide constructive recommendations as to how any design or construction difficulties can be resolved; and
- The Audit should be carried out on the basis of the information supplied to the Audit Team and should only address matters that have an adverse bearing on road safety in the context of the chosen design, with no attempt to comment on the justification or appropriateness of the chosen scheme.

In addition to the above features, Standard HD19/15 includes a model illustrating the recommended layout of the report document.

In view of the above points, no responsibility for the design or construction of the scheme can be accepted by the Auditors.

It is confirmed that the Road Safety Audit undertaken in respect of this particular scheme has been carried out in accordance with the procedures and practices detailed above. It is also confirmed that this is a Stage 1 Audit, i.e. one carried out on the completion of preliminary design. The Road Safety Audit team is aware of previous Safety Audits (stage 1 & 2 audits for the main link and access roads) carried out on the proposed scheme.

2. Road Safety Audit Team

2.1 The Audit Team consisted of:

K E [REDACTED] BSc (Hons), MSc, CEng, MCIHT, MSoRSA (Team Leader)
Principal Road Safety Engineer, Capita

H K [REDACTED] MCIHT, MSoRSA
Road Safety Engineer, Capita

3. Scope of the Road Safety Audit

- 3.1 This Audit reviews, from the Road Safety aspect, the Eastern Bay Link Road Scheme, including its interfaces with contiguous lengths of road and abutting side roads. At this stage of the scheme development the Stage 1 Road Safety Audit is required for Queens Gate roundabout and Ocean Way roundabouts only, not the main link. The proposals are shown on the documents listed in the section entitled "Information Forming the Basis of the Audit" and broadly consist of:
- (a) Both junctions will be subject to a 30mph speed limit. Queens Gate Roundabout improvements include a segregated left turn lane, circulatory widening, full signalisation, and upgrade of controlled crossing at Pierhead St junction. Ocean Way roundabout will be fully signalised
 - (b) Provision of a separate shared use cycleway/footway linking into existing facility; and
 - (c) Provision of new drainage, vehicle restraint systems, signing, carriageway markings, and street lighting.
- 3.2 No Departures from Standards have been declared by the Designer
- 3.3 A design speed of 50mph & 40 mph has been adopted for the main link road and 30 mph for both roundabouts.
- 3.4 The site was visited on Tuesday 22nd September 2015 where the weather was fine and the road surface was dry.

4. Information Forming the Basis of the Audit

4.1 This Road Safety Audit was undertaken on the proposals detailed in the following documentation:

Drawings No.

Queens Gate Roundabout

EBL-CAP-0100-QGR-SK-C-0165	Preliminary General Arrangement
EBL-CAP-0300-QGR-SK-C-0167	Preliminary Fencing
EBL-CAP-0400-QGR-SK-C-0169	Preliminary Road Restraint Design
EBL-CAP-0500-QGR-SK-C-0171	Preliminary Drainage Design
EBL-CAP-0700-QGR-SK-C-0173	Carriageway Construction Preliminary Design
EBL-CAP-1200-QGR-SK-C-0175	Traffic Signs and Road Markings Preliminary Design
EBL-CAP-1300-QGR-SK-C-0180	Preliminary Road Lighting Layout
EBL-CAP-1200-QGR-SK-C-0177	Traffic Signals Preliminary Design
EBL-CAP-1200-QGR-SK-C-0179	Pierhead Street junction Traffic Signals Preliminary Design
EBL-CAP-0000-QGR-SK-C-0140	Pierhead Street General Arrangement
EBL-CAP-7000-RW4-DR-S-7001	Proposed Retaining Wall

Ocean Way Roundabout

EBL-CAP-0100-OWR-SK-C-0166	Preliminary General Arrangement
EBL-CAP-0300-OWR-SK-C-0168	Preliminary Fencing
EBL-CAP-0400-OWR-SK-C-0170	Preliminary Road Restraint Design
EBL-CAP-0500-OWR-SK-C-0172	Preliminary Drainage Design
EBL-CAP-0700-OWR-SK-C-0174	Carriageway Construction Preliminary Design
EBL-CAP-1200-OWR-SK-C-0176	Traffic Signs and Road Markings Preliminary Design
EBL-CAP-1300-OWR-SK-C-0181	Preliminary Road Lighting Layout
EBL-CAP-1200-OWR-SK-C-0178	Traffic Signals Preliminary Design

Other Documents

RSA brief (EBL-CAP-0000-PJW-SA-C-0181).

5. Declaration

We confirm that this Road Safety Audit has been undertaken on the documents listed in the section entitled "Information Forming the Basis of the Audit" in accordance with the recommended procedures and represents an independent assessment of the road safety implications at this stage of this scheme's design.

No member of the Road Safety Audit team has been involved in scheme design.

Audit Team Leader

K E [REDACTED] BSc(Hons), MSc, CEng
MCIHT, MSoRSA
Principal Road Safety Engineer
Capita
St David's House
Pascal Close
St Mellons
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CF3 0LW



Signed

25th May 2016

Date

Audit Team Member

H K [REDACTED] MCIHT, MSoRSA
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CF3 0LW

6. Site Specific Comments and Recommendations

For the locations of the points raised in this section, see the Reference Plan (Figure 1).

Ocean Way Roundabout

6.1 Problem

Location: Ocean Way roundabout (Drawing No. EBL-CAP-0100-OWR-SK-C-0166).

Forward visibility for northbound vehicles towards the maintenance layby is restricted due to extensive foliage within the central island. As a consequence, faster moving vehicles travelling through the traffic signals on a green signal may not expect to encounter slow moving vehicles emerging from the layby. In the worst case may result in side impact collisions.

Recommendation

Improve forward visibility towards the maintenance layby, by removing extensive foliage within the central island.

Designers Response

Agreed.

6.2 Problem

Location: EBL eastbound dedicated single lane (Drawing No. EBL-CAP-1200-OWR-SK-C-0178).

Forward visibility for northbound vehicles towards the nearside primary traffic signal head and stop line on the gyratory at the intersection with the new link road is restricted due to extensive foliage within the central island. As a consequence, approaching vehicles may fail to see the signal head and not expect to encounter queueing vehicles at the stop line, resulting in rear end shunt collisions.

Recommendation

Improve forward visibility towards the traffic signal head and stop line, by removing extensive foliage within the central island.

Designers response

Agreed

6.3 Problem

Location: Ocean Way roundabout (Drawing No. EBL-CAP-1200-OWR-SK-C-0178).

On all three approaches to traffic signals on the roundabout circulatory, forward visibility towards the traffic signal heads on the circulatory carriageway and the associated stop lines are restricted due to extensive foliage within the central island. In the worst case, approaching vehicles may fail to see the traffic signals and not expect to encounter queueing vehicles at the stop line, resulting in rear end shunt collisions.

Recommendation

Improve forward visibility towards the traffic signal heads and stop lines, by removing extensive foliage within the central island

Designers Response

Agreed.

6.4 Problem

Location: Ocean Way roundabout (Drawing No. EBL-CAP-0500-OWR-SK-C-0172).

On the northbound nearside approach to Ocean Way roundabout there is a low spot within the carriageway. Whilst the carriageway is to be reprofiled no new road gullies are proposed. During cold weather it is likely that this surface water freeze water creating icy conditions which may result in skidding or loss of control collisions.

Recommendation

Provide positive drainage in this area.

Designers Response

Agreed.

6.5 Problem

Location: Ocean Way roundabout (Drawing No. EBL-CAP-1200-OWR-SK-C-0176).

There is only one lane on the circulatory approach to the western traffic signals assembly. Some drivers on the northbound Ocean Way approach to the roundabout may not realize it is left turn only lane and continue straight on in conflict with ahead vehicles, increasing the risk of side swipe collisions.

Recommendation

Either provide 2 lane approach on the circulatory carriageway or provide lane delineation carriageway markings / wicket signs.

Designers Response

Agreed, provide better markings/signing.

6.6 Problem

Location: Ocean Way roundabout (Drawing No. EBL-CAP-1200-OWR-SK-C-0176).

The traffic signal ahead warning signs within the central island are likely to be obscured by foliage within the central island, in the worst case drivers may not expect to encounter traffic signals resulting in rear end shunt collisions.

Recommendation

Ensure forward visibility to signs is provided and duplicate signs on nearside.

Designers Response

Agreed, forward visibility to be improved.

6.7 Problem

Location: Ocean Way roundabout (Drawing No. EBL-CAP-1200-OWR-SK-C-0176).

The yellow box junction marking on the north eastern circulatory carriageway is located some 15m from the junction, it is likely that queueing vehicles from Ocean Way north will obstruct passage for vehicles on circulatory increasing the risk of rear end shunt collisions from approaching vehicles.

Recommendation

Relocate the box junction marking towards the junction.

Designers Response

Agreed, position of yellow box junction marking to be reviewed.

6.8 Problem

Location: Ocean Way roundabout (Drawing No. EBL-CAP-1200-OWR-SK-C-0176).

There is no merge facility for southbound vehicles exiting the roundabout towards Ocean Way south/Rover Way prior to the toucan crossing. Faster moving vehicles in the inside lane on circulatory may try to overtake slower moving vehicles increasing the risk of collisions with the traffic island or side swipe collisions.

Recommendation

Realign exit and provide a merging facility.

Designers Response

Noted. The southern exit is single lane. Carriageway markings to be reviewed in detailed design stage.

6.9 Problem

Location: Ocean Way roundabout (Drawing No. EBL-CAP-1200-OWR-SK-C-0176).

The right turn lane arrow on the southbound approach to Ocean Way roundabout maybe misinterpreted by users, particularly foreign lorry drivers who may turn at the junction in collision with head on vehicles.

Recommendations

Do not provide right turn lane arrow and replace with straight on arrow

Designers Response

Noted. Carriageway markings to be reviewed in detailed design stage and agreed with CCC.

6.10 Problem

Location: Ocean Way Roundabout (Drawing No. EBL-CAP-1300-OWR-SK-C-0181).

It is proposed to replace street lighting columns no 3,4,5,6 in the existing footway. If the columns are relocated in the same location they will be within the working width of safety barriers or reduce the available footway width for pedestrians.

Recommendation

Relocate columns to the back of the footway.

Designers Response

The existing street lighting columns are to remain, the luminaires are being replaced.

Queens gate Roundabout

6.11 Problem

Location: Queens Gate roundabout (Drawing No. EBL-CAP-1200-QGR-SK-C-0175).

Right turn arrows are proposed on approaches to traffic signals at Queens Gate roundabout. The arrows maybe misinterpreted by users, particularly foreign lorry drivers who may turn at the junction in collision with head on vehicles.

Recommendation

Do not provide right turn lane arrow and replace with straight on arrow.

Designers Response

Noted. Carriageway markings to be reviewed in detailed design stage and agreed with CCC.

6.12 Problem

Location: Queens Gate roundabout (Drawing No. EBL-CAP-1200-QGR-SK-C-0175).

The two offside lanes on the Pierhead street approach do not align with corresponding lanes on the circulatory carriageway, in the worst case lane swapping may occur resulting in side swipe collisions. Vehicles in the offside lane maybe squeezed out.

Recommendation

Modify the alignment of this approach and provide elephant feet markings to guide users towards the appropriate lanes.

Designers Response

Noted. Approach has been designed utilising existing road space due to restrictions with land availability/ownership. Carriageway markings to be reviewed at detail design stage to guide vehicles towards appropriate lanes.

6.13 Problem

Location: Queens Gate roundabout (Drawing No. EBL-CAP-0000-MLR-SK-C-0025).

In the north western circulatory carriageway at the tightest radii, the circulatory carriageway width is some 8m, this arrangement may lead larger vehicles to encroaching into the adjacent lane in conflict with other vehicles.

Recommendation

Check swept paths and widen lanes if necessary.

Designers Response

Agreed, vehicle swept paths to be reviewed.

6.14 Problem

Location: Queens Gate roundabout (Drawing No. EBL-CAP-0100-QGR-SK-C-0165).

The additional traffic lanes on approaches and circulatory carriageway may cause confusion for drivers when taking directions. There are no worded lane destination markings on the approach to the roundabout or on the circulatory carriageway this lack of information may be confusing to users leading to late lane changing and potential side swipe collisions.

Recommendation

Provide worded lane destination markings.

Designers Response

Noted. Lane destination markings to be reviewed and discussed with Client and CCC.

6.15 Problem

Location: Queens Gate roundabout (Drawing No. EBL-CAP-0700-OWR-SK-C-0173).

The length of new surfacing from the A4232 tunnels is some 20m in length. Approach speeds to the roundabout are likely to be in the region of 40/50mph. Too short high friction surfacing on this approach may affect vehicles braking increasing the risk of skiddings, loss of control collisions.

Recommendations

Extend the new surfacing further north.

Designers Response

Agreed.

6.16 Problem

Location: Queens Gate roundabout (Drawing No. EBL-CAP-0700-QGR-SK-C-0173).

The new surface course with PSV 60 terminates on the apex of the tight radius of the exit from the circulatory carriageway towards the City Centre. At this point vehicles will be negotiating tight curvature. This inconsistent surfacing may result in loss of control collisions.

Recommendations

Extend the new surfacing further around the bend.

Designers Response

Agreed.

6.17 Problem

Location: Queens Gate roundabout (Drawing No. EBL-CAP-1200-OWR-SK-C-0175).

On the Pierhead Street approach to the roundabout the proposed lane destination sign may obscure the nearside traffic signal head. As a consequence vehicles emerging maybe in collision with vehicles on the circulatory carriageway.

Recommendations

Relocate sign away from the signal head.

Designers Response

Agreed.

6.18 Problem

Location: Queens Gate roundabout (Drawing No. EBL-CAP-1200--SK-C-0175).

There are a number of right turn lane arrows on the approach to the roundabout, these arrows maybe misinterpreted by users, particularly foreign lorry drivers who may turn at the junction in collision with head on vehicles.

Recommendations

Do not provide right turn lane arrow and replace with straight on arrow

Designers Response

Noted. Carriageway markings to be reveiwed in detailed design stage and agreed with CCC.

6.19 Problem

Location: Queens Gate roundabout (Drawing No. EBL-CAP-1200-QGR-SK-C-0175).

The width of segregated left turn lane from the tunnel (A4232) direction is below 8m for 2 lanes taken around a tight curvature. Larger vehicles may encroach into adjacent lane and hit the island.

Recommendations

Check swept paths, particularly larger HGV's.

Designers Response

Agreed, vehicle swept paths to be reviewed.

6.20 Problem

Location: Queens Gate roundabout (Drawing No. EBL-CAP-1200-QGR-SK-C-0175).

On the northbound exit towards A4234 Central Link there are no lane markings or get over arrows provided at the merge. Two lanes on the circulatory carriageway will guide drivers to continue to the A4234 exit side by side and may cause incorrect positioning and side swipe collisions.

Recommendations

Provide get over arrows at the merge exit or lane markings to guide vehicle into correct lanes.

Designers Response

Agreed.

6.21 Problem

Location: Queens Gate roundabout (Drawing No. EBL-CAP-1200-QGR-SK-C-0175).

There are inconsistencies with the lane destination wicket traffic signs and the associated lane arrows. This confusing information may cause lane swapping and side swipe collisions.

Recommendations

Ensure lane destination signs and arrows are consistent.

Designers Response

Agreed.

6.22 Problem

Location: Queens Gate roundabout (Drawing No. EBL-CAP-1200-QGR-SK-C-0177).

Although the roundabout is subject to 30mph vehicles are likely to be approaching at excessive speeds from the A4234. Forward visibility towards offside primary signal head and associated stop line on A4234 approach therefore can be restricted. This lack of visibility may result in harsh braking and rear end collisions.

Recommendations

Ensure there is clear forward visibility to signal head.

Designers Response

Agreed.

6.23 Problem

Location: Queens Gate roundabout (Drawing No. EBL-CAP-1200-QGR-SK-C-0177).

For circulatory traffic on the approach to the most southern traffic signals at the junction with Pierhead Street the head is restricted by foliage this lack of information may result in harsh braking and rear end collisions on the approach to the traffic signals.

Recommendations

Ensure there is clear forward visibility to traffic signal heads.

Designers Response

Agreed.

6.24 Problem

Location: Queens Gate roundabout (Drawing No. EBL-CAP-1200-QGR-SK-C-0177).

Forward visibility to the traffic signal stop lines on the circulatory carriageway is restricted by foliage that could result in harsh braking and rear end collisions on the approach to the traffic signals.

Recommendations

Ensure there is clear forward visibility to traffic signal heads and vegetation within central island cleared.

Designers Response

Agreed.

Appendix A Reference Plan



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